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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	10/615,671
	Filing Date	July 9, 2003
	First Named Inventor	John F. Porter
	Art Unit	1771
	Examiner Name	Pierce, Jeremy R.
Total Number of Pages in This Submission	Attorney Docket Number	D1815-00068

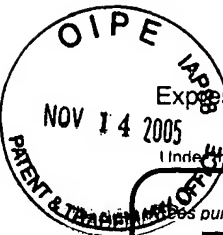
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# FEE TRANSMITTAL For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 500.00

## Complete if Known

Application Number	10/615,671
Filing Date	July 9, 2003
First Named Inventor	John F. Porter
Examiner Name	Pierce, Jeremy R.
Art Unit	1771
Attorney Docket No.	D1815-00068

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## FEE CALCULATION

### 1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

### 2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

**Total Claims**      **Extra Claims**      **Fee (\$)**      **Fee Paid (\$)**      **Multiple Dependent Claims**  
\_\_\_\_\_ - 20 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_      **Fee (\$)**      **Fee Paid (\$)**  
HP = highest number of total claims paid for, if greater than 20

**Indep. Claims**      **Extra Claims**      **Fee (\$)**      **Fee Paid (\$)**  
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### 3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

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Non-English Specification, \$130 fee (no small entity discount)

Other: Appeal Brief

**Fees Paid (\$)**

\$500.00

## SUBMITTED BY

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re application of: Porter and Roberts

Confirmation No. 9831

Serial No.: 10/615,671

Group Art Unit: 1771

Filed: July 9, 2003

Examiner: Pierce, Jeremy R.

For: Fabric Reinforcement And Cementitious Boards Faced With Same

Certification under 37 CFR § 1.10

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Sir:

**APPEAL BRIEF**

Pursuant to 37 C.F.R. § 41.37, Applicants hereby submit this appeal brief. The appeal brief is being timely submitted under 37 C.F.R. § 41.37(a), the date of the Notice of Appeal being September 15, 2005. The appeal brief is being submitted in triplicate.

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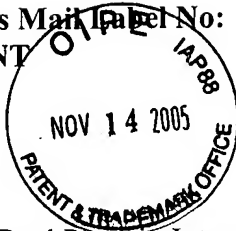
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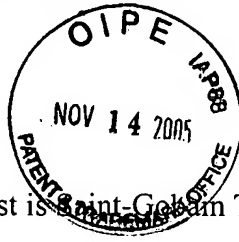
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**I. Real Party in Interest**

The real party in interest is Saint-Gobain Technical Fabrics, present owner of the application and the invention described therein.

**II. Related Appeals and Interferences**

There are no related appeals or interferences.

**III. Status of Claims**

Claims 1-9 and 22-29 are pending in the present application. Claims 10-21 and 30-35 were withdrawn from consideration in response to a provisional election made during a telephone conference with the Examiner on November 16, 2004 and affirmed in Applicants' Amendment filed on February 16, 2005. Claims 1-9 and 22-29 stand rejected, and their rejection is hereby appealed.

**IV. Status of Amendments**

No after-final amendments were submitted with respect to the appealed claims 1-9 and 22-29.

**V. Summary of Claimed Subject Matter**

Applicants' invention relates to a resin-coated, alkali-resistant fabric useful in reinforcing cementitious materials. Embodiments of an exemplary fabric are shown in FIGS. 1-6. Features of the fabric are also described at, for example, paragraphs [0050]-[0088] of the specification (Patent Application filed July 9, 2003 at 11-26). The term "fabric" is defined by Applicants at paragraph [0030] of the specification as "[w]oven or non-woven flexible materials, such as tissues, cloth, knits, weaves, carded tissue, spun-bonded, point-bonded, and mesh-type scrim wovens and nonwovens, needled or braided materials." There is no mention of a solid resinous matrix in this definition. All of Applicants' claims are directed to a "fabric", except for Claim 23, which is directed to the use of the "fabric" in a cementitious board. Accordingly, the claimed

fabric or fabric component of each claim must necessarily fall within this defined term, i.e., they all must be woven or nonwoven flexible materials.

Features of the fabric of independent claim 1 are shown in FIGS. 1-6. The fabric is described at, for example, paragraphs [0061] – [0080] (p. 14, ln. 16 - p. 22, ln. 14), and the resinous coating feature of the fabric is described more particularly at paragraphs [0081] – [0088] (p. 22, ln. 24 – p. 26, ln. 9). The fabric (10, 14, 15, 16) of independent claim 1 includes warp yarns 106 having a first twist, weft yarns 102 having a second twist that is greater than the first twist, and resinous coating 107 disposed over both warp and weft yarns where the coating weight distribution ratio of weft (cross-machine-direction) yarns to warp (machine-direction) yarns is less than about 2.0:1.

Independent claim 22 is directed to a resin-coated, multifilament yarn-based woven, braided, nonwoven mesh-type, or knitted fabric (10, 14, 15, 16). The claimed fabric is made of warp yarns 106 having a first twist, weft yarns 102 having a second twist that is greater than the first twist, and resinous coating 107 disposed over both warp and weft yarns. The resinous coating is applied the warp and weft yarns while the warp yarns are pulled in tension such that the weft yarns absorb less of the coating than the weft yarns would if they had a twist lesser than the twist of the warp yarns.

Independent claim 25 is also directed to a resin-coated, multifilament yarn-based, woven, braided, nonwoven mesh-type, or knitted fabric (10, 14, 15, 16). The claimed fabric is made of warp yarns 106 containing a glass filament having a twist of about 0-.3 turns/inch, weft yarns 102 containing a glass filament having a twist of about .7-1.0 turns/inch, and a resinous coating 107 disposed over both warp and weft yarns where the coating weight distribution ratio of weft (cross-machine-direction) yarns to warp (machine-direction) yarns is less than about 2.0:1. The glass filaments are described, for example, in paragraphs [0052] – [0057] (p. 11, ln. 27 –p. 13, ln. 20), [0072] – [0078] (p. 18, ln. 19 – p. 21, ln. 24).

Independent claim 26 is also directed to a resin-coated, multifilament yarn-based woven, braided, nonwoven mesh-type, or knitted fabric. The claimed fabric is made of warp yarns 106

having a first twist, weft yarns 102 having a second twist, and a resinous coating 107 disposed over both warp and weft yarns where the coating weight distribution ratio of weft (cross-machine-direction) yarns to warp (machine-direction) yarns is less than about 2.0:1.

As described in paragraph [0066] of the specification (p. 16, ln. 10-19), the greater degree of twist in weft yarns 102 than in warp yarns 106 allows more resinous coating to be absorbed into the warp yarns, the goal of which is to achieve a better uniformity of coating and, hence, enhanced fabric properties before use in a matrix. Minimization of the coating weight distribution ratio, having a claimed maximum value of about 2.0:1 and an ideal value of 1:1 (Specification ¶ [0066], p. 16, ln. 19), is preferable as this characteristic is one of several which determine certain fabric properties such as drapability and resistance to degradation in an alkaline matrix (Specification ¶ [0063], p. 15, lns. 11-15).

## VI. Grounds of Rejection To Be Reviewed on Appeal

1. Whether claims 1-9 and 25-29 are subject to rejection under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

2. Whether claims 1-5, 7, 9, 22, and 25-29 are subject to rejection under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,460,633 to Kobayashi et al. (hereinafter “Kobayashi”), or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Kobayashi.

3. Whether claim 23 is subject to rejection under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi in view of U.S. Patent No. 4,581,275 to Endo et al. (hereinafter “Endo”).

4. Whether claims 6, 8, and 24 are subject to rejection under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi in view of Endo and in further view of U.S. Patent No. 5,038,555 to Wu et al. (hereinafter “Wu”).

## VII. Argument

Claims 1-9 and 25-29, rejected as failing to comply with the written description requirement of 35 U.S.C. § 112, first paragraph, are presented as a first group of claims (“Group I”). Claims 1-5, 7, 9, 22, and 25-29, rejected under 35 U.S.C. § 102(a) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Kobayashi, are presented as a second group of claims (“Group II”). Claims 6, 8, and 24, rejected under 35 U.S.C. § 103(a) as being obvious over Kobayashi in view of Endo in further view of Wu, are presented as a third group of claims (“Group III”).

**A. The Group I claims meet the written description requirement of 35 U.S.C. § 112, first paragraph, because there is support in the specification for application of the resinous coating to the fabric prior to bonding the fabric to or embedding the fabric within a matrix.**

The Action rejects claims 1-9 and 25-29 as failing to comply with the written description requirement of 35 U.S.C. § 112, first paragraph, because the claims contain subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. (Official Action of May 17, 2005, ¶ 4, at 3.) Specifically, the Examiner states that although claims 1, 25, and 26 have been amended to recite that the resinous coating is applied to the warp and weft yarns before said reinforcement is applied to a matrix, the paragraph cited by Applicants to support this limitation, paragraph [0090], is silent with respect to the limitation and “nothing is disclosed as to when the resinous coating is applied as compared to the time when the material is bonded to a matrix.” (Id.)

Applicants previously cited paragraph [0090] in the context of amending independent claims 1, 25, and 26 to include the weight distribution ratio limitation. Specifically, Applicants stated that said weight distribution ratio ( $WPU_{cd} / WPU_{md}$ ) of less than about 2.0:1 is “measured at the point before the fabric reinforcement is embedded or adhesively or mechanically bonded to the matrix, as supported in paragraph [0090] of Applicants’ specification.” (Amendment of Feb.



16, 2005 at 13.) Applicants further explained that “these amendments make it abundantly clear that both the warp and weft yarns of the present invention are coated with a resinous coating before the fabric reinforcement is applied to a matrix, such as cement for a cementitious board, for example.” (Id.)

Applicants maintain that there is **ample** support in the specification, including paragraph [0090], for application of the resinous coating to the weft and warp yarns of the fabric **prior to** application of the fabric to the matrix. The fundamental nature of Applicants’ invention, as described in paragraph [0001] of the specification, is that the “invention relates to **coated** reinforcing fabrics, and more particularly to alkali-resistant fabric reinforcements for cementitious materials.” (p. 1, lns. 9-10 (emphasis added).) As described in paragraph [0003] (p. 1, lns. 18-22), because fiber compositions, particularly glass fiber compositions, typically degrade in an alkaline environment of a cement core, “they must be coated with a protective finish” prior to their use in such an environment.

As described in paragraphs [0008] (p. 3, lns. 12-15), [0011] (p. 4, lns. 17-25), one of the problems existing in the art is unequal coating of warp and weft yarns due, in part, to the asymmetry of tensions in the two directions—warp (i.e., machine direction) yarns typically having a higher tension as the fabric is pulled through the coating, drying, and winding processes. One of the improvements of Applicants’ invention over the prior art is to bring about a more uniform overall coating application to the fabric. (Specification ¶ [0013], p. 5, lns. 9-11 (“The fabric further includes an alkali-resistant coating disposed over a substantial portion of the warp and weft yarns after they have been assembled or laid . . . .”); ¶ [0014], p. 5, lns. 20-22; ¶ [0017], p. 6, ln. 29 - p. 7, ln. 18 (“Applicants have further determined that the coated reinforcing fabric of this invention, when embedded into cement boards, can achieve years of alkali resistance . . . .”).) That the coating is applied to the fabric **prior to** application of the fabric to the matrix is further supported by the description of the manufacture of the fabric in the specification. (See Specification ¶ [0064], p. 15, lns. 25-28 (“The reasons for this asymmetry in coating weight is that the tension in the machine direction, or warp yarns, is normally much higher than that in the cross-machine direction, or weft yarns, at the time of the coating

operation. This is due to the normal tension necessary to pull the fabric through the continuous processing operations, which often include sequential coating, drying and winding steps.”.)

As noted above, paragraph [0090] of the specification also supports application of the resinous coating to the fabric **prior to** application of the fabric to the alkaline matrix. Paragraph [0090] explains that as shown in FIG. 6, fabric 10 can be either embedded in the cementitious core 101, so as to present a thin cementitious film 108 on the face of the board 100, or embedded or adhesively or mechanically bonded to the core 101. (p. 26, lns. 17-20.) FIG. 7, magnifying a portion of FIG. 6, clearly shows the resinous coating 107 applied to warp yarns 106 and weft yarns 102 on both the outside facing 113 as well as the inside face of the fabric interfacing with the cementitious core 101.

Therefore, because there is ample support in the specification of application of the resinous coating to the fabric **prior to** application of the fabric to the matrix, claims 1, 25, and 26 and the remaining claims of Group I which depend therefrom comply with the written description requirement of 35 U.S.C. § 112, first paragraph.

**B. The Group II claims are not anticipated under 35 U.S.C. § 102(b) by, nor rendered obvious under 35 U.S.C. § 103(a) over Kobayashi, U.S. Patent No. 4,460,633, because Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix and, instead, teaches away from impregnation of warp yarns prior to use of the reinforcement in a matrix.**

**1. Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix.**

The Action rejects claims 1-5, 7, 9, 22, and 25-29 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Kobayashi. The Examiner concludes that Kobayashi discloses a reinforcement fabric comprising warp and weft yarns that are soft twist multifilament yarns, that the weft yarns have a greater twist than the

warp yarns, and that a “matrix resin” is applied to the fabric after the fabric has been treated with “adhesive agent.” (Official Action of May 5, 2005, ¶ 7, at 4.) The Examiner further concludes that although Kobayashi does not teach the coating weight distribution ratio of less than 2.0:1, “it is reasonable to presume that said limitations are inherent to the invention” (*id.*), or, in the alternative, “the claimed ratio of coating weight would obviously have been provided by the process disclosed by Kobayashi” because Kobayashi teaches that inhibiting impregnation of “matrix resin” to the warp yarns is preferably avoided and that improved strength is obtained with “matrix resin” impregnated into the warp yarns (*id.* at 4-5).

Although “[t]here is nothing inconsistent in concurrent rejection for obviousness under 35 U.S.C. § 103 and for anticipation by inherency under 35 U.S.C. § 102,” *In re Best*, 562 F.2d 1252, 1255 n.4 (C.C.P.A. 1977), such a rejection is based on the premise that “the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes,” *id.* at 1255. Applicants’ invention is, however, fundamentally different from, and therefore, not identical or substantially identical to Kobayashi, primarily, though not exclusively, because Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix.

Kobayashi discloses a “non-woven” (abstract; col. 2, lns. 5-6, 32, 44; col. 3, ln. 37; claim 1, col. 8, ln. 8) reinforcement of a “resinous composite” (abstract; col. 1, ln. 56; col. 2, lns. 6, 33, 45; col. 3, lns. 18), said reinforcement being constructed of warps and wefts bonded together at their intersections with an “adhesive agent” (abstract; col. 2, lns. 11, 35, 37; col. 3, lns. 10, 12, 22-23, 24, 33; col. 4, ln. 38; claim 1, col. 8, lns. 14, 16). Once Kobayashi’s reinforcement is applied to a “matrix resin” (col. 1, ln. 68; col. 2, lns. 13-14, 41, 61; col. 3, lns. 17, 34) or “resinous composite” (col. 3, lns. 17-18), it is no longer a flexible fabric, but a solid composite structure.

In contrast, Applicants’ invention is directed to a “fabric” (*see, e.g.*, Specification ¶ [0013], p. 5, ln. 6; claims 1, 22, 25, 26) useful as a reinforcement for “a matrix” (*see, e.g.*, Specification ¶ [0013], p. 5, ln. 7; ¶ [0086], p. 24, lns. 22-24; ¶ [0091], p. 26, lns. 26, 30; claims 1, 22, 25, 26), such as an “alkaline matrix” (*see, e.g.*, Specification ¶ [0013], p. 5, ln. 7; claim 1), said fabric being either “woven, knit or mesh-type (scrim) nonwoven” (*see, e.g.*, Specification ¶

[0008], p. 3, ln. 7; ¶ [0012], p. 4, ln. 26-27; ¶ [0013], p. 5, ln. 18; ¶ [0019], p. 7, lns. 11-12; ¶ [0070], p. 17, lns. 15-16), and said reinforcement being constructed of warp yarns and weft yarns and “a resinous coating” (see, e.g., Specification ¶ [0008], p. 3, ln. 8; ¶ [0013], p. 5, ln. 9-11; ¶ [0078] – [0088], p. 20, ln. 23 – p. 26, ln. 9; claims 1, 22, 25, 26) disposed over said warp yarns and weft yarns.

One of the more striking differences in the features of Kobayashi compared to Applicants’ invention is that the Kobayashi reinforcement “is not [and cannot be] a woven fab[r]ic,” (col. 3, ln. 37), whereas Applicants’ invention includes woven, knit or mesh-type (scrim) nonwoven fabrics. Indeed, Kobayashi teaches away from woven fabrics, explaining that woven fabrics have a considerably low reinforcing effect in comparison with a reinforcement having no flexed warp. (Col. 1, lns. 6-9; col. 3, lns. 36-38.)

However, beyond this difference, and more direct to the basis of the Examiner’s rejection of claims 1-5, 7, and 9, is that Applicants’ invention is directed to a resin-coated fabric reinforcement, the object of reinforcement being a matrix that presents an alkaline environment, which, but for the resin-coating, would degrade the fabric considerably.

In other words, the “resinous coating” applied to the fabric is part of the claimed invention, whereas use in a “matrix” is the end-use of the claimed invention. Further, the resinous coating applied to Applicants’ fabric is disposed over **both weft and warp yarns** of the fabric, with a specific limitation that the coating weight distribution ratio ( $WPU_{cd} / WPU_{md}$ ) be less than about 2.0:1. (Claims 1, 22, 25, 26.)

In contrast, Kobayashi is directed to a reinforcement constructed of wefts and warps that are bonded together at their intersections with an “adhesive agent.” The use of said reinforcement is to reinforce a “resinous composite” that is formed from a “resin matrix.” In other words, the adhesive agent of Kobayashi is the only resin applied to the fabric, while it is still a fabric and before it is inserted within a resin matrix. This distinction is fundamentally important because Kobayashi teaches impregnation of **only weft yarns** by the adhesive agent. (Col. 2, lns. 7-11 (“The reinforcement is constructed with warps consisting of non-twist yarns or soft twist yarns . . . on both sides of **wefts** of non-twist yarns or soft twist yarns **containing**

**adhesive agent**, in which the warps and wefts are bonded at intersections of them.”) (emphasis added); col. 2, lns. 32-38 (“**adhesive agent is impregnated into the wefts**, and warp bundles are piled up on the both side [sic] of the wefts to fasten the warps with the adhesive agent **impregnated into the weft alone.**”) (emphasis added); col. 3, ln. 10 (“The adhesive agent is impregnated into the wefts.”). As noted above, Applicants’ invention claims “a resinous coating disposed over a substantial portion of said warp **and** wefts yarns” (see, e.g., claim 1 (emphasis added).)

In view of this explanation, the Examiner’s assertion that the “matrix resin” of Kobayashi “would comprise Applicant’s claimed resinous coating” is erroneous. (Official Action of May 17, 2005 ¶ 7, at 4.) The Examiner supports this assertion by reasoning that although Kobayashi teaches impregnation of only the weft fibers by the adhesive agent, “the matrix resin applied thereafter is coated on both the warp and weft fibers (column 3, lines 32-44). This resin meets Applicant’s claim limitation of a ‘resinous coating’ because it is a resin and it is coated onto the fibers.” (Official Action of May 17, 2005 ¶11, at 7.) This reasoning ignores two important points. First, unlike Applicants’ invention, because the wefts of the Kobayashi reinforcement are impregnated with adhesive agent, the wefts are not (and indeed cannot be) subsequently impregnated with matrix resin. (See col. 2, ln. 35 (“adhesive agent is impregnated into the wefts”); col. 1, lns. 67-68 (“the application of adhesive agent . . . inhibits impregnation of matrix resin”).)

Second, the Kobayashi reinforcement is applied to a “resinous composite” or “resin matrix” **as an end-use reinforcement application**. Once the Kobayashi reinforcement is applied to the resinous composite or resin matrix, it is embedded and is no longer a fabric, and cannot be used to reinforce further matrices. One of the primary patentable features of Applicants’ invention is that the fabric is coated with a resinous coating **for the express purpose** of using the claimed coated fabric in a reinforcement application subsequent to application of the resinous coating.

One of the purposes of coating the fabric with a resinous coating is to enhance durability of the fabric in an alkaline environment. (Specification ¶ [0011], p. 4, lns. 17-25; ¶ [0013], p. 5, lns. 9-19; claim 23.) Further, the coating weight distribution ratio limitation is particularly

important to this feature as a ratio of less than about 2.0:1 is preferable in enhancing certain fabric properties such as resistance to degradation and drapability. Arguably, once Kobayashi adds his fabric to a resinous matrix, the fabric is no longer drapable or flexible and there is no evidence in Kobayashi that once his fabric is impregnated and cured within a resinous matrix, that this cured composite has any utility as a reinforcement in a second matrix material, such as cement. In fact, Kobayashi's fabric then is no longer a fabric at all, but a solid composite. Applicants therefore maintain that the coating weight distribution ratio of less than about 2.0:1 is not inherent to the invention disclosed in Kobayashi, since Kobayashi never achieves this ratio while it is a fabric, and provides no evidence as to how to achieve such a ratio in a fabric nor why this would be important in later matrix applications. This limitation is, therefore, neither taught nor suggested by the reference. (See Amendment of Feb. 16, 2005 at 14.)

Applicants' amendment of the claims to include the coating weight distribution ratio limitation demonstrates that Applicants endeavor to find a solution to a corrosion problem that is not appreciated by Kobayashi. As explained above, Applicants' invention is directed to a resin-coated fabric wherein the resinous coating impregnates both warp and weft yarns prior to use of the fabric in a matrix, such as, for example, the alkaline matrix of a cement board, in an end-use reinforcement application. Coating both warp and weft yarns prior to use of the fabric avoids gaps and voids that would expose the warp and weft yarns to possibly corrode. Kobayashi, on the other hand, teaches impregnation of wefts by an adhesive agent, and not impregnating the warps, prior to using the resulting fabric in a resin matrix. (Col. 2, lns. 5-12, 31-38.) During subsequent use of the Kobayashi fabric in a resinous matrix, the resin matrix impregnates only the warp yarns, since they are free to absorb matrix resin, but the wefts are not able to absorb matrix resin, since they are already impregnated by adhesive. In short, whereas Applicants seek to **avoid** impregnation of the warp and weft yarns of their fabric by the matrix to which the claimed resin-coated fabric is applied, Kobayashi seeks to **maximize** impregnation of the warps in his fabric by the matrix to which the reinforcement is applied.

**2. Kobayashi teaches away from impregnation of warp yarns prior to use of the reinforcement in a matrix.**

To maximize impregnation of warps by the matrix to which the Kobayashi reinforcement is applied, Kobayashi **teaches away** from impregnation of the warps in his fabric prior to application to the matrix. It is well established that “[a]n applicant may rebut a prima facie case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect.” In re Peterson, 315 F.3d 1325, 1331, 65 U.S.P.Q.2d 1379 (Fed. Cir. 2003); see also, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1354, 60 U.S.P.Q.2d 1001 (Fed. Cir. 2001) (“We have noted . . . , as a ‘useful general rule,’ that references that teach away cannot serve to create a prima facie case of obviousness.”); In re Haruna, 249 F.3d 1327, 1335, 58 U.S.P.Q.2d 1517 (Fed. Cir. 2001). “In general, a reference will teach away if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant.” In re Gurley, 27 F.3d 551, 553, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994); see also Tec Air, Inc. v. Denso Mfg. Mich. Inc., 192 F.3d 1353, 1360, 52 U.S.P.Q.2d 1294, 1298 (Fed. Cir. 1999) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant.”). A “reference teaches away if it leaves the impression that the product would not have the property sought by the applicant.” In re Caldwell, 319 F.2d 254, 256, 138 U.S.P.Q. 243, 245 (C.C.P.A. 1963).

Kobayashi indisputably teaches away from impregnation of warps prior to use of the reinforcement in the matrix: “the application of adhesive agent to warps i.e. reinforcing fibers, inhibits impregnation of matrix resin into the reinforcement to frequently cause the generation of voids which deteriorate reinforcing effect” (col. 1, ln. 67 – col. 2, ln. 2); “a non-woven reinforcement for composites, which comprises warps on at least one side of wefts bonded at intersections of the warps and the wefts, **in which the warps consist of a multi-filament . . . and comprise no impregnated adhesive agent**” (claim 1).

In teaching that impregnation of the warps by adhesive resin should be avoided prior to use of the Kobayashi fabric in a matrix, Kobayashi expressly teaches away from Applicants’ invention, which requires coating the warp yarns prior to use in a matrix. Following a direction divergent from the Kobayashi teaching, Applicants have discovered that impregnation of warps (and wefts) by a resinous coating with the claimed coating weight distribution ratio prior to use

of the reinforcement in a matrix can solve the problem of corrosion of these yarns in caustic environments, such as the alkali environment associated with the production of cement boards. Indeed, were Applicants to follow Kobayashi's teaching of non-impregnated warps, the resultant product would not have the important and desirable feature of being resistant to corrosion in an alkaline environment that Applicants' invention exhibits.

Therefore, because Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix and, instead, expressly teaches away from impregnation of warp yarns prior to use of the reinforcement in a matrix, claims 1, 25, and 26 and the remaining claims of Group II which depend therefrom are not anticipated by, nor obvious over, Kobayashi.

**C. Claim 23 is not obvious over Kobayashi in view of Endo because there is no suggestion or motivation to combine the references, and even when combined, the references do not teach or suggest all the claim limitations of Applicants' invention.**

The Action rejects claim 23<sup>1</sup> under 35 U.S.C. § 103(a) as being obvious over Kobayashi in view of Endo. The Examiner concludes that Kobayashi teaches a fabric reinforcement, Endo teaches use of the fabric to reinforce cement, and it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the fabric of Kobayashi to reinforce cement in order to derive greater usage from the fabric. (Official Action of May 5, 2005, ¶ 8, at 6.)

In order to establish a prima facie case of obviousness, the Examiner has the initial burden of establishing, with factual support, three basic criteria: (1) some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of

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<sup>1</sup> Claim 23 recites as follows: "A cementitious board incorporating the multifilament yarn-based woven, braided, non-woven mesh-type or knitted fabric of claim 22."



ordinary skill in the art, to modify the reference or to combine reference teachings; (2) a reasonable expectation of success; and (3) the prior art reference (or references when combined)—and not the Applicant’s disclosure—must teach or suggest all the claim limitations. MPEP § 2142. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the [E]xaminer must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

Regarding the first requirement, “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” MPEP § 2143.01 (citing In re Mills, 916 F.2d 680 (Fed. Cir. 1990)). Further, “[i]t is improper to combine references where the references teach away from their combination.” MPEP § 2145 (citing In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983)). Regarding the third requirement, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” MPEP § 2143.03 (quoting In re Wilson, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (CCPA 1970)). Applicants contend that the Examiner has not established either the first or third requirements with respect to the rejection of claim 23.

First, regarding the third requirement of the prima facie case for obviousness, Applicants assert that the combination of Kobayashi and Endo does not teach or suggest all the claim limitations of Applicants’ invention. As explained in detail above, Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix and, instead, teaches away from impregnation of warp yarns prior to use of the reinforcement in a matrix. Further, Endo teaches away from impregnation of either of the warp and weft yarns, explaining that “penetration of matrix resin into base cloth is disturbed by the influence of the impregnating adhesive to cause a poor reinforcement strength” (col. 1, lns. 45-46); “[where the weft is] impregnated with adhesives, adhesion of the weft to matrix resins is poor and the reinforcement in the weft direction is not sufficient” (col. 1, lns. 52-55); and “From Table 3, it can be seen that the base cloth prepared with the adhesive-impregnated fibers is insufficient in cement reinforcing

effect as compared with the base cloth of the present invention. The reason for this may be considered as follows: Cement does not penetrate into the base cloth prepared with the adhesive-impregnated fibers, showing no compatibility with the base cloth” (col. 7, ln. 41 – col. 8, ln. 6).

Further still, neither Kobayashi nor Endo teaches the limitation of a coating weight distribution ratio of less than about 2.0:1 prior to use in a cement board matrix. Because neither reference discloses or suggests impregnation of warp yarns with a resinous coating prior to use of the reinforcement in a cement board matrix or the coating weight distribution ratio limitation, the references do not, singly or in combination, teach or suggest all the claim limitations of Applicants’ invention and, therefore, the combination of the references does not render claim 23 obvious.

Second, regarding the first requirement of the prima facie case for obviousness, Applicants assert there is no suggestion or motivation to combine the references as proposed by the Examiner. On this point, Endo teaches away from the combination proposed by the Examiner. Endo teaches that use of a reinforcement with adhesive-impregnated warps and wefts is “insufficient in cement reinforcing effect” because the “cement does not penetrate into . . . the adhesive-impregnated fibers” (col. 7, ln. 41 – col. 8, ln. 6). This teaching is divergent from Applicants’ invention, which teaches coating the warp and weft yarns of the fabric reinforcement with a resinous coating to protect the warp and weft yarns from corrosion in, e.g., the alkaline environment of a cement matrix. Because Endo teaches that impregnation of the warp and weft yarns is unlikely to be productive of a “sufficient” application of the reinforcement to a cement matrix, Endo even teaches away from Kobayashi, which teaches impregnation of weft yarns with adhesive agent. Consequently, the Examiner’s proposed combination does not form a legal basis for rejecting claim 23 for obviousness.

Because there is no suggestion or motivation in the references or in the knowledge generally available to one of ordinary skill in the art to combine Kobayashi and Endo, and because the references when combined do not teach or suggest all the claim limitations of Applicants’ invention—and in fact appear incompatible since Endo suggests leaving the coating off both the weft and warp yarns and Kobayashi requires impregnating the wefts before use in a

matrix—the Examiner has not established a prima face case of obviousness and, therefore, claim 23 was improperly rejected by the Examiner as being obvious over Kobayashi in view of Endo.

**D. The dependent claims of Group III are not obvious over Kobayashi in view of Endo in further view of Wu because all of the independent claims are patentable over Kobayashi and the combination of Kobayashi and Endo, and the Examiner’s application of Wu adds nothing affecting this conclusion.**

The Action rejects claims 6, 8, and 24 under 35 U.S.C. § 103(a) as being obvious over Kobayashi in view of Endo in further view of Wu. The Examiner concludes that although Kobayashi and Endo do not teach using a poly(vinyl chloride) (“PVC”) coating, Wu teaches that fiberglass scrims used to reinforce concrete are coated with PVC plastisol and, regarding claim 8, that lubricity can be provided to the glass fibers before applying the PVC coating; therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to coat the fiberglass scrim of Kobayashi with PVC in order to make fiberglass reinforcement suitable for reinforcing cement, as taught by Wu. (Official Action of May 5, 2005, ¶ 9, at 6.)

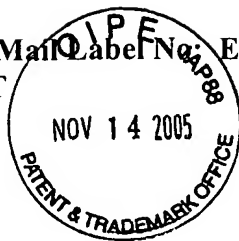
As explained in detail above, Applicants assert that none of the independent claims 1, 22, 25, and 26 is anticipated by or obvious over Kobayashi because Kobayashi does not teach coating or impregnation of warp yarns prior to use of the reinforcement in a matrix and, instead, teaches away from impregnation of warp yarns prior to use of the reinforcement in a matrix. Applicants have also explained in detail above that the Examiner’s proposed combination of Kobayashi and Endo is improper because there is no suggestion or motivation to combine these references, and even when combined, the references teach away from each other and do not teach or suggest all the claim limitations of Applicants’ invention. Because all the independent claims are patentable over Kobayashi as well as the proposed combination of Kobayashi and Endo, Applicants assert that dependent claims 6, 8, and 22 are a fortiori patentable over Kobayashi and the proposed combination of Kobayashi and Endo. In re Fine, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”); accord Hartness Int’l, Inc. v. Simplimatic

Eng'g Co., 819 F.2d 1100, 1108, 2 U.S.P.Q.2d 1826, 1831 (Fed. Cir. 1987); In re Abele, 684 F.2d 902, 910, 214 U.S.P.Q. 682, 689 (C.C.P.A. 1982); cf. 37 C.F.R. § 1.75 ("Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.").

The Examiner's application of Wu, teaching that fiberglass scrims used to reinforce concrete can be coated with PVC plastisol and that lubricity can be provided to the glass fibers before applying the PVC coating, adds nothing that would render Applicants' invention unpatentable over Kobayashi or the combination of Kobayashi and Endo. The combination of these references fails to disclose a fabric in which weft and warp yarns, having first and second twists, respectively, are pre-coated with a 2.0:1 weight distribution ratio, or lower, prior to being used in a matrix. Therefore, the Group III claims are not obvious over the proposed combination of Kobayashi, Endo, and Wu.

## VIII. CONCLUSION

For the reasons stated above, the Examiner's rejection of claims 1-9 and 22-29 is erroneous. Applicants submit that this application is in condition for allowance and respectfully request reversal of the rejection of claims 1-9 and 22-29.



Claims Appendix

1. (previously presented) A fabric reinforcement useful in reinforcing an alkaline matrix comprising:

- (a) a plurality of warp yarns having a first twist (turns/inch);
- (b) a plurality of weft yarns having a second twist which is greater than said first twist; and
- (c) a resinous coating disposed over a substantial portion of said warp and weft yarns after they have been assembled or laid together, such as to produce a coating weight distribution ratio ( $WPU_{cd} / WPU_{md}$ ) of less than about 2.0:1, before said fabric reinforcement is embedded within, or adhesively or mechanically bonded to said alkaline matrix.

2. (original) The fabric of claim 1 wherein said warp yarns comprise a first twist of about 0-.5 turns/inch.

3. (original) The fabric of claim 2 wherein said weft yarns comprise a second twist of about 0.5 – 1.3 turns/inch.

4. (original) The fabric of claim 1 wherein said warp yarns, said weft yarns, or both, comprise glass fibers.

5. (original) The fabric of claim 1 wherein said warp yarn and weft yarns are assembled into one or more of:

a woven fabric, knit fabric, laid scrim fabric, or braided fabric.

6. (previously presented) The fabric of claim 1 wherein said resinous coating comprises a polyvinyl-chloride-based plastisol.

7. (original) The fabric of claim 1 wherein said plurality warp yarns are drawn in tension prior to the application of said resinous coating.

8. (previously presented) The fabric of claim 1 wherein said warp yarns are selected to include, or are treated with, a hydrophilic agent, prior to a water based coating, or an oleophilic agent prior to a polyvinyl-chloride plastisol coating.

9. (previously presented) The fabric of claim 1 wherein said weft yarns are selected to include, or are treated with, an oleophobic agent prior to a pvc-based plastisol coating, or a hydrophobic agent prior to a water based coating.

10. (withdrawn) A reinforced cementitious board comprising:

- (a) a cementitious core; and
- (b) a reinforcing fabric disposed on at least one face of said cementitious core; said reinforcing fabric including:
  - (i) a plurality of warp yarns having a first twist (turns/inch);
  - (ii) a plurality of weft yarns having a second twist which is greater than said first twist; and

(c) a resinous coating applied to said reinforcing fabric in a coating weight distribution ratio of less than about 2.0:1 based upon the weight of the resinous coating on the weft yarns, over the weight of the resin on the warp yarns.

11. (withdrawn) The cementitious board of claim 10 wherein said cementitious core comprises Portland cement.

12. (withdrawn) The cementitious board of claim 10 wherein said reinforcing fabric comprises a woven, braided, nonwoven mesh-type or knitted fabric.

13. (withdrawn) The cementitious board of claim 10 wherein said first twist of said warp yarns is about 0-.3 turns/inch.

14. (withdrawn) The cementitious board of claim 13 wherein said second twist of said weft yarns is about .7-1.0 turns/inch.

15. (withdrawn) The cementitious board of claim 10 wherein said resinous coating comprises an alkali-resistant resin.

16. (withdrawn) A reinforced cementitious board comprising:

(a) a cementitious core comprising Portland cement; and

(b) a reinforcing fabric disposed generally around and embedded into a portion of said cementitious core; said reinforcing fabric being composed of a multifilament yarn-based woven, braided, nonwoven mesh-type, or knitted fabric which includes:

(i) a plurality of warp yarns having a first twist (turns/inch);

(ii) a plurality of weft yarns having a second twist, said second twist being greater than said first twist; and

(c) an alkali resistant resinous coating applied to said plurality of warp and said plurality of weft yarns after they have been assembled or laid together, such as to produce a coating weight distribution ratio of less than about 2.0:1 based upon the weight of the resinous coating on the weft yarns over the weight of the resinous coating on the warp yarns.

17. (withdrawn) The cementitious board of claim 16 wherein said reinforcing fabric comprises sized glass fibers.

18. (withdrawn) The cementitious board of claim 16 wherein said warp yarns have a twist of about 0-.3 turns/inch.

19. (withdrawn) The cementitious board of claim 18 wherein said weft yarns have a twist of about .7-1 turns/inch.

20. (withdrawn) The cementitious board of claim 16 wherein said alkali resistant coating provides alkali resistance to said reinforcing fabric beyond one year in a Portland cement board.

21. (withdrawn) The cementitious board of claim 20 wherein said resinous coating comprises a pvc matrix having an oil phase distributed therein.



22. (original) A multifilament yarn-based woven, braided, nonwoven mesh-type, or knitted fabric comprising:

- (a) a plurality of warp yarns having a first twist (turns/inch);
- (b) a plurality of weft yarns having a second twist, said second twist being greater than said first twist; and
- (c) a resinous coating applied to said plurality of warp and said plurality of weft yarns while the warp yarns are being pulled in tension in a machine direction, such that the weft yarns absorb less of said resinous coating than said weft yarns would absorb if the second twist of said weft yarns was equal to the first twist of said warp yarns.

23. (original) A cementitious board incorporating the multifilament yarn-based woven, braided, non-woven mesh-type or knitted fabric of claim 22.

24. (original) The fabric of claim 22 wherein said resinous coating comprises a alkali resistant resin.

25. (previously presented) A multifilament yarn-based woven, braided, nonwoven mesh-type, or knitted fabric suitable for subsequent use as a matrix reinforcement comprising:

- (a) a plurality of warp yarns containing a glass filament having a first twist of about 0-.3 turns/inch.
- (b) a plurality of weft yarns containing a glass filament having a second twist of about .7-1.0 turns/inch; and

(c) a protective resinous coating applied to said plurality of warp and weft yarns after they have been assembled or laid together, such as to produce a weight distribution ratio ( $WPU_{cd} / WPU_{md}$ ) of less than about 2.0:1 before said reinforcement is applied to a matrix, said weight distribution ratio created in substantial part by the difference in twists of said warp and weft yarns.

26. (previously presented) A multifilament yarn-based woven, braided, non-woven mesh-type, or knitted fabric suitable for subsequent use as a matrix comprising:

- (a) a plurality of warp yarns having a first twist (turns/inch);
- (b) a plurality of weft yarns having a second twist; and
- (c) a resinous coating applied to said plurality of warp yarns and said plurality of weft yarns after they have been assembled or laid together, such as to produce a coating weight distribution ratio ( $WPU_{cd} / WPU_{md}$ ) of less than about 2.0:1 before said fabric is embedded within, or adhesively or mechanically attached to a matrix.

27. (original) The fabric of claim 26 wherein said first twist ratio is less than said second twist ratio.

28. (original) The fabric of claim 26 wherein said weft yarns have a lower hydrophilicity than said warp yarns.

29. (previously presented) The fabric of claim 26 wherein said tension is applied to said weft yarns.

30. (withdrawn) A method of making a coated fabric comprising:
- (a) providing a plurality of warp yarns having a first twist (turns/inch);
  - (b) assembling a plurality of weft yarns with said warp yarns, said weft yarns having a second twist; said second twist being greater than said first twist; and
  - (c) applying a resinous coating to assembly of said plurality of warp yarns and plurality of weft yarns, whereby the weight of the resinous coating on the weft yarns over the weight of the resinous coating on the warp yarns is less than about 2.0:1.
31. (withdrawn) The method of claim 30 wherein said weft yarns, warp yarns, or both, comprise glass filaments.
32. (withdrawn) The method of claim 30 wherein the weight of the resinous coating on the weft yarns over the weight of the resinous coating on the warp yarns is less than about 1.5:1.
33. (withdrawn) The method of claim 30 wherein said resinous coating comprises a plastisol.
34. (withdrawn) A method of making a cementitious board, comprising:
- (a) providing a cementitious slurry;
  - (b) depositing said cementitious slurry onto a moving reinforcing fabric, said reinforcing fabric comprising a plurality of warp yarns having a first twist (turns/inch), a

plurality of weft yarns having a second twist which is greater than said first twist; and a resinous coating applied to said reinforcing fabric in a coating weight distribution ratio of less than about 2.0:1, based upon the weight of the resinous coating on the weft yarns, over the weight of the resinous coating on the warp yarns;

(c) shaping said cementitious slurry and said reinforcing fabric into a board, whereby said reinforcing fabric is disposed on at least one face thereof, and

(d) permitting said cementitious slurry to set.

35. (withdrawn) The method of claim 34 wherein said forming step is continuous or discontinuous.